BIO 204 – Biological Techniques

COURSE PARTICULARS

Course Code: BIO 204  
Course Title: Biological Techniques  
No. of Units: 3  
Course Duration: Two hours of theory and three hours of practical per week for 15 weeks.  
Status: Compulsory  
Course Email Address: bio204@gmail.com  
Course Webpage: http://www.bio.futa.edu.ng/courseschedule.php?coursecode=BIO%204  
Prerequisite: BIO 204

COURSE INSTRUCTORS

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and

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COURSE DESCRIPTION

This course is explanatory and designed primarily for 200level students in biology and biochemistry. It educates the students on different techniques used in the laboratories and methods of detecting contaminants in stored commodities. As a practical course, the focus is to impart useful skills on the students on how to use microscopes for specimen identification, how to prepare slides of cells, tissues and parasites, and also different analytical methods used in the laboratories. Topics to be covered include microscopy, preparation of microscopic slides, photometry, colorimetry, chromatography, conductometry, experimental design, electrophoretic techniques, centrifugation and techniques used in detecting contaminants in stored commodities.
COURSE OBJECTIVES

The objectives of this course are to:

- give the students basic understanding of microscopy and also to familiarise them with the uses of different types of microscopes used in biological science laboratories.
- provide the students with the practical skills of preparing microscope slides.
- expose the students to the basic principles of photometry, colorimetry, chromatography, conductometry, centrifugation and electrophoretic techniques.
- acquire basic knowledge of designing biological experiments.
- afford the students with the techniques of detecting contaminants in stored products.

COURSE LEARNING OUTCOMES / COMPETENCIES

Upon successful completion of this course, the student will be able to:

(Knowledge based)

- identify different parts of a microscope.
- list different types of microscopes and their functions.
- describe the basic principles of light microscopy and electron microscopy.
- describe the uses, principles and preparation of samples for photometry, colorimetry, chromatography, centrifugation and electrophoresis.
- know different types of experimental designs.

(Skills)

- operate different types of microscopes in the laboratory.
- prepare microscope slides of specimens such as plant and animal cells, thin and thick smears for detection of tissue parasites and squash of soft specimens.
- operate laboratory equipment such as photometer, colorimeter, paper and thin layer chromatography, conductometer and centrifuge.
- acquire skills to design laboratory experiments.
- acquire skills for detecting contaminants in stored products.

GRADING SYSTEM FOR THE COURSE

This course will be graded as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Class Attendance</td>
<td>10%</td>
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<tr>
<td>Practical</td>
<td>15%</td>
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<td>Test(s)</td>
<td>15%</td>
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<tr>
<td>Final Examination</td>
<td>60%</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td><strong>100%</strong></td>
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GENERAL INSTRUCTIONS

**Attendance:** It is expected that every student will be in class for lectures and also participate in all practical exercises. Attendance records will be kept and used to determine each person’s qualification to sit for the final examination. In case of illness or other unavoidable cause of absence, the student must communicate as soon as possible with any of the instructors, indicating the reason for the absence.

**Academic Integrity:** Violations of academic integrity, including dishonesty in assignments, examinations, or other academic performances are prohibited. You are not allowed to make copies of another person’s work and submit it as your own; that is plagiarism. All cases of academic dishonesty will be reported to the University Management for appropriate sanctions in accordance with the guidelines for handling students’ misconduct as spelt out in the Students’ Handbook.

**Practical:** Students are expected to submit practical reports as scheduled. Failure to submit report as at when due will earn you zero for that assignment. Only under extenuating circumstances, for which a student has notified any of the instructors in advance, will late submission be permitted.

**Code of Conduct in Lecture Rooms and Laboratories:** Students should turn off their cell phones during lectures and practicals. Students are prohibited from engaging in other activities (such as texting, watching videos, etc.) during lectures. Food and drinks are not permitted in the laboratories. No student will be allowed into the laboratories without a labcoat, practical book and manual.

READING LIST


Legend
1- Available as Personal Collection
2- Available in Departmental/School Libraries
## COURSE OUTLINE

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>1 &amp; 2</td>
<td>Microscopy: Light microscopy and electron</td>
<td>During this first class, the students will be introduced to different types of microscopes (light and electron). Parts of microscopes</td>
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<td></td>
<td>Types of light microscopes and electron</td>
<td>will also be practically demonstrated to the students during lecture and practical classes. Students will also be taught how to</td>
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<tr>
<td></td>
<td>microscopes.</td>
<td>set up a light microscope.</td>
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<tr>
<td>3 &amp; 4</td>
<td>Preparation of microscope slides</td>
<td>Detailed procedures of how to prepare microscope slides will be discuss in this topic.</td>
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<tr>
<td>5</td>
<td>Photometry.</td>
<td>Students will be taught the basic principle of photometry.</td>
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<tr>
<td>6</td>
<td>Colorimetry</td>
<td>The function of colorimeter and the principle of colorimetry will be discuss extensively to the students.</td>
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<tr>
<td>7</td>
<td>Conductometry</td>
<td>The function and principle of conductometry will be discuss in this topic.</td>
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<tr>
<td>8&amp;9</td>
<td>Chromatography</td>
<td>Types and function of chromatography will be discussed in this topic. Paper chromatography will be practically demonstrated to the</td>
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<tr>
<td>Week</td>
<td>Topic</td>
<td>Details</td>
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<tr>
<td>10</td>
<td>Electrophoretic techniques</td>
<td>Step by step procedures of electrophoresis will be discussed to the students and the use of electrophoresis will also be emphasized during this class.</td>
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<td>11 &amp; 12</td>
<td>Experimental design</td>
<td>Types of experiments, types of experimental designs and basic features of each design will be elaborated during the class.</td>
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<tr>
<td>13 &amp; 14</td>
<td>Techniques used in detecting contaminants in stored commodities.</td>
<td>During the class, students will be taught different methods of detecting contaminants in stored commodities. Also, methods of preservations to prevent contamination will also be discussed during the class.</td>
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<tr>
<td>15</td>
<td>Revision</td>
<td>This is the week preceding the final examination. At this time, evaluation will be done to assess how far the students’ expectations for the course have been met.</td>
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